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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/494,877	01/31/2000	Zhigang Fang	70239-00086	4072
58688 7590 03/22/2010 CONNOLLY BOVE LODGE & HUTZ LLP P.O. BOX 2207 WILMINGTON, DE 19899				
EXAMINER YANG, JIE				
ART UNIT		PAPER NUMBER		
1793				
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03/22/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

## Application No.

09/494,877

## Applicant(s)

FANG ET AL.

## Examiner

JIE YANG

## Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 February 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1, 7, 11-14, 19-21, 25-27, 29, 33, 34, 37 and 41-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 7, 11-14, 19-21, 25-27, 29, 33, 34, 37 and 41-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/22/2010 has been entered.

### ***Status of the Claims***

Claims 1, 14, 25, 33, and 43 are amended, claims 1, 7, 11-14, 19-21, 25-27, 29, 33, 34, 37, and 41-44 are pending.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 7, 11, 12, 14, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 05-156301 (From abstract and machine translation, thereafter

JP'301) as evidenced by Nakamura et al (US 5,934,542, thereafter US'542) and in view of JP 10-284547 (Abstract, figure, and table, thereafter JP'547).

JP'301 teaches mixing Super INVAR powder and a ceramic powder in 75:25 to 25:75 mixture. The mixture is sintered with an organic binder (Abstract). The ceramic is a carbide ([0006]. Regarding claims 1 and 20, the coefficient of thermal expansion of the ceramic is within the claimed range as shown in Table 4 and [0016] ( i.e. 1.2-6.5ppm/°C). JP'301 teaches that the sintered mixture can be used in powder machine parts, an electric device and measuring equipment such as IC boards [0001-0002]. However, JP'301 does not specify WC as recited in claims 1 and 14, JP'547 teaches a contact tool for lead material bonding in IC chip used in semiconductor devices that contain a tool base made of WC dispersed in a phase of Co. It would have been obvious to one of ordinary skill in the art at the time the invention was made that the carbide in JP'301 could include WC, since JP'547 and JP'301 teaches using similar material (carbides) for the same component, i.e. IC equipment.

Regarding the composition of Super INVAR as it relates to claims 1, 7, 14, and 19, Super INVAR has a composition of 64wt%Fe; 29wt%Ni; 17wt%Co; and at most 0.5wt%C and Mn as evidenced by US'542 (Col.17, lines 47-50 of US'542), the Ni

composition is within the Ni range as recited in claims 7 and 19.

JP'301 as evidenced by US'542 and in view of JP'547 teaches WC with Fe base binder alloy, which reads on the limitations of first phase including WC and second phase including Fe based binder alloy as recited in the instant claims 1 and 14. Because the applicant applying "comprising" language for cermets material of claims 1 and 14, the other phases except from first and second phases are not excluded from the composition.

The coefficient for thermal expansion of WC is 5.2ppm/°C (refer to page 6, lines 31-32 of the instant specification). The absolute difference between the mixture of JP'301 and that of WC would range from 0-4.0ppm/°C, which is within the claimed range of claims 11, 12, and 21. The coefficient for thermal expansion of WC-Co is 5-6ppm/°C (refer to page 12, lines 21-22 of the instant specification). Therefore the coefficient for thermal expansion of the mixture of JP'301 overlaps the range of being less than WC-Co. In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a prima facie case of obviousness exists. See MPEP 2144.05.

Claims 13, 25-27, 29, 33, 34, 37, 41-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sue et al (US 2006/0222853, thereafter, PG'853) in view of JP'301 as evidenced by US'542 and in view of JP'547.

Regarding claims 13, 33, 34, 37, 41, and 42, PG'853 teaches a roller cone rock bit comprising three legs with a roller cutter cone mounted on the lower end of each leg. The cutting inserts are provided in the surfaces of the cutter cone ([0063] of PG'853). PG'853 teaches that cemented WC can be used as cutting inserts in roller cone rock bits, where the WC is combined with alloys from the group consisting of Co, Ni, Fe, and others ([0009] of PG'853). PG'853 also teaches a composite construction having a core of WC and Co powder surrounded by a shell of cobalt metal ([0032] of PG'853). The Co powder can be replaced with alloys of Ni and Fe ([0009] of PG'853). However, PG'853 does not specify that the inserts are made with the composition of claim 1 as in claim 13 or the composition in claim 33. JP'301 as evidenced by US'542 and in view of JP'547 is applied as discussed above with respect to the first and second phases in claim 33, the composition of Ni in claim 37, the thermal expansion of WC-Co in claims 41 and 42, and the difference between the coefficients of thermal expansions in claims 42. It would have been obvious to one of ordinary skill

in the art at the time the invention was made to use the composition of JP'301 as evidenced by US'542 and in view of JP'547 has a low coefficient of thermal expansion. Known work in one field of endeavor may prompt variations of it for use in either the same field of a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art.

Regarding claims 25-27 and 29, PG'853 teaches a composite construction having a core of WC and Co powder surrounded by a shell of cobalt metal ([0032] of PG'853). The Co powder can be replaced with alloys of Ni and Fe ([0009] of PG'853). However, PG'853 does not specify the second phase of binder alloy as claimed. JP'301 as evidenced by US'542 and in view of JP'547 is applied as discussed above with respect to the first and second phases in claim 25, the thermal expansion of WC-Co in claim 26, the coefficient of thermal expansion in claim 27, and the difference between the coefficients of thermal expansion of claim 29. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the binder composition as the mixture in JP'301 as evidenced by US'542 and in view of JP'547, since the composition of JP'301 as evidenced by US'542 and in view of JP'547 has a low coefficient of thermal expansion. Known work in one field of endeavor may prompt

variations of it for use in either the same field of a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art.

Regarding claims 43 and 44, PG'853 teaches a composite construction having a core of WC and Co powder surrounded by a shell of cobalt metal ([0032] of PG'853) to form coated fibers. The composite construction has a oriented microstructure and the fibers are bundled together ([0008] of PG'853). The Co powder can be replaced with alloys of Ni and Fe ([0009] of PG'853). However, PG'853 does not specify the binder alloy as in claim 43 or the properties as in claims 43 and 44. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the binder composition as the mixture in JP'301 as evidenced by US'542 and in view of JP'547, since the composition of JP'301 as evidenced by US'542 and in view of JP'547 has a low coefficient of thermal expansion. Known work in one field of endeavor may prompt variations of it for use in either the same field of a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art.

JP'301 as evidenced by US'542 and in view of JP'547 teaches WC with Fe base binder alloy, which reads on the limitations of first phase including WC and second phase including Fe based



binder alloy as recited in the instant claims 25, 33, and 43. Because the applicant applying "comprising" language for cermets material, cone rock bit, and cermets composition of claims 25, 33 and 43, respectively, the other phases except from the first and second phases are not excluded from the composition.

### ***Response to Arguments***

Applicant's arguments filed on 5/11/2009 with respect to claims 1, 7, 11-14, 19-21, 25-27, 29, 33, 34, 37, and 41-44 have been fully considered but they are not persuasive. Regarding the arguments related to the amended feature in the instant claims, the Examiner's position has been stated as above.

Applicant's arguments are summarized as follows:

A) Regarding rejection for claims 1, 7, 11, 12, 14, and 19-21, the combination of JP'301, US'542 and JP'547 could not produce a material composition that is missing in each other since JP'301 and JP'547 fail to disclose a binder alloy having the same material make up as Applicants' binder recited in independent claims 1 and 14. One having ordinary skill in the art combining these references would not find Applicants' cermet material as recited in claims 1 and 14.

B) Regarding rejection for claims 13, 25-27, 29, 33, 34, 37, 41-44, Applicants have amended independent claims change the term "consisting essentially of" to "consisting of". Thus, the cermet materials of the instant claims have very special material content. Namely, one having a first phase of WC grains and second phase of

iron, Co, Ni, C, and Mn. Sue et al (PG'853) fails to disclose a binder alloy having a specific material content recited in Applicants' independent claims.

Examiner's responses are as follows:

Regarding the arguments A), as pointed out in the previous office action marked 8/21/2009 and 1/9/2009, JP'301 teaches mixing Super INVAR powder and carbide ceramic powder in 75:25 to 25:75 mixture and the mixture is sintered with organic binder (Abstract and paragraph [0006] of JP'301). JP'547 teaches WC dispersed in a phase of Co (abstract of JP'547) and Nakamura et al (US'542) teaches the specific Super INVAR composition. JP'301 as evidenced by US'542 and in view of JP'547 teaches WC with Fe base binder alloy, which reads on the limitations of first phase including WC and second phase including Fe based binder alloy as recited in the instant claims 1 and 14. Because the applicant applying "comprising" language for cermet material of claims 1 and 14, the other phases except from first and second phases are not excluded from the composition.

Regarding the argument B), as pointed out in the previous office action marked 8/21/2009 and 1/9/2009, PG'853 teaches a roller cone rock bit comprising three legs with a roller cutter cone mounted on the lower end of each leg. The cutting inserts are provided in the surfaces of the cutter cone. PG'853 teaches that cemented WC can be used as cutting inserts in roller cone rock bits, where the WC is combined with alloys from the group consisting of Co, Ni, Fe, and others, which reads on the cermet material and cone rock bit as recited in the instant claims 13, 33, and 43. Regarding the specific binder alloy in the instant claims, as pointed out in the previous office action marked

8/21/2009 and 1/9/2009, JP'301 as evidenced by US'542 and in view of JP'547 is applied as discussed above with respect to the first and second phases. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the binder composition as the mixture in JP'301 as evidenced by US'542 and in view of JP'547, since the composition of JP'301 as evidenced by US'542 and in view of JP'547 has a low coefficient of thermal expansion. Known work in one field of endeavor may prompt variations of it for use in either the same field of a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art. Because the applicant applying "comprising" language for cermets material of claims 25, 33, and 43, the other phases except from first and second phases are not excluded from the composition. The Examiner further notes that the Applicants admitted the binder alloy may be included in the mixture or blend of materials such as Co, Ni, Fe, W, Mo, Ti, Ta, V, and Nb, which may be alloyed with each other or with C, B, Cr, or Mn (Page 3, summary of invention and Page 7, last paragraph of the specification of the instant application). The applicant has not shown that the introduction of the additional alloy elements of the cited prior art would materially change the characteristics of applicant's invention.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

/Roy King/  
Supervisory Patent Examiner, Art Unit 1793